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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,184	09/10/2003	Yadong Li	138543 (SPLG 1077)	7486

45436 7590 10/25/2007

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EXAMINER	
SMITH, JEFFREY S	

ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
10/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/659,184	LI ET AL.	
	Examiner	Art Unit	
	Jeffrey S. Smith	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6,7,9,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6,7,9,26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6-7 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abdel-Malek and Kamath, and further in view of U.S. Patent Number 6,674,879 issued to Weisman et al. ("Weisman").

Claim 6 does not limit the environment to an ultrasound environment. The claim, at the very end, recites that the first and second images are "speckle-reduced images using parameters of the first value set and the second value set," yet this phrase appears disconnected from the rest of the claim. For example, the claim does not specify that the simultaneously filtering results in multiple speckle reduced ultrasound images, nor that the adjustable parameters are speckle reduction parameters that determine the amount of speckle that is removed from an unfiltered ultrasound image, nor that the amount of speckle that is removed from the first filtered ultrasound image is different than the amount of speckle that is removed from the second filtered ultrasound image. In other words, this claim broadly reads on any speckle reduction method that performs simultaneous filtering of any image, regardless of whether it is an ultrasound image, and simultaneously displays two filtered versions of the image, where the filtered

versions include speckle reduction. Even so, a narrow interpretation is addressed in this action in order to advance prosecution.

For claim 6, Figure 2 of Abdel-Malek discloses receiving a processed data stream from a processor (data signal 30 from the receiver is processed from an analog to a digital data stream), dividing the processed data stream into data subsets (subinterval divide 32), filtering the data subsets by using a speckle reduction filter to produce filtered data subsets (threshold processor 38), and producing an image data stream based on the filtered data subsets (scan converter 22).

Abdel-Malek does not disclose simultaneously filtering the data subsets.

Figure 7 of Kamath discloses dividing the processed data stream into data subsets (step 72 partitioning data into regions and distributing regions onto processors) and simultaneously filtering the data subsets (step 75 thresholding wavelet coefficients of transformed data).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the simultaneous filter of Kamath with the speckle noise filter of Abdel-Malek because Kamath provides the motivation at column 5 lines 3-7 of peforming "a substantial amount of processing on very large data sets," which can occur when "the data is in the form of images."

Weisman discloses changing values of the parameters between first and second value sets to form a first and second image data streams; and simultaneously co-displaying a first image and a second image on a common screen, wherein the first image is generated from the first image data stream, and wherein the second image is

generated from the second image data stream (see the filter and enhance buttons in figs. 5 and 7 and see col. 13 lines 2-4). The first image and the second image are speckle reduced images using parameters of the first value set and the second value set, respectively. Weisman shows four images that are simultaneously co-displayed on a common screen, one of which is the raw image. The other three images are speckle reduced images that are generated from different sets of parameters and are simultaneously co-displayed on a common screen. The image next to the raw image is the speckle reduced image. The image under the raw image is generated from edge detection parameters applied to the speckle reduced image. The image diagonal to the raw image is generated from color quantization parameters applied to the speckle reduced and edge detected image. Weisman therefore shows three speckle reduced images, generated using three different sets of parameters, that are simultaneously co-displayed on a common screen.

It would have been obvious to one of ordinary skill in this art at the time of the invention to include the simultaneous co-display of the filtered images with the speckle reduction filter of Abdel-Malek and Kamath for the benefit of providing report generation that improves the analysis of an ultrasound image at taught by Weisman in the abstract.

Although the claim does not explicitly recite that the adjustable parameters are adjustable speckle reduction parameters that are changed to change the amount of speckle that is filtered from the image, nor that the amount of speckle in the first image is different than the amount of speckle in the second image, these interpretations will be addressed in order to advance prosecution. Weisman in col. 13 lines 1-6 states that

"The physician may then choose one of several processing combinations from menus. The default is for processing average images with moderate speckle. However, the physician may also choose options for light or heavy speckle."

One of ordinary skill in the art, after reading Weisman, can replace the multiple filtered versions of a raw image that are co-displayed in figure 7 with multiple speckle filtered versions of the raw image produced by the adjustable speckle reduction parameters in col. 13 lines 1-6 to yield the predictable result of a simultaneous co-display of lightly filtered, moderately filtered, and heavily filtered speckle reduced images.

Claims 26 and 27, which are computer readable medium and apparatus claims having elements similar to claim 6, are rejected for these reasons also.

Claim 26, similar to claim 6, does not limit the environment to an ultrasound environment. The claim recites that the first and second images are "speckle-reduced images using parameters of the first value set and the second value set," yet this phrase appears disconnected from the rest of the claim. For example, the claim does not specify that the simultaneously filtering results in a speckle reduced ultrasound image, nor that the adjustable parameters are speckle reduction parameters that adjust the amount of speckle that is removed from the ultrasound image, nor that the amount of speckle that is removed from the first image is different than the amount of speckle that is removed from the second image. Even so, these features have been cited in Abdel-Malek, Kamath, and Weisman in order to advance prosecution.

Claim 27 recites ultrasound in the preamble, however, the preamble is not given patentable weight. The transducer array recited in the claim performs no function and is unrelated to the other elements. The claim does not recite that the transducer array generates ultrasound signals. Similarly, the claim does not recite that the beamformer receives the ultrasound signals. The functions performed by the beamformer are not specified by the claim. The other limitations with respect to speckle reduction filtering discussed above apply to this claim as well. This claim reads on any system that performs simultaneous filtering and displays two speckle reduced images. However, ultrasound and speckle reduction filtering features have been read into the claim in order to advance prosecution.

For claim 7, Figure 2 of Abdel-Malek discloses receiving a processed data stream from a processor (data signal 30 from the receiver is processed from an analog to a digital data stream), dividing the processed data stream into data subsets (subinterval divide 32), filtering the data subsets by using a speckle reduction filter to produce filtered data subsets (threshold processor 38), and producing an image data stream based on the filtered data subsets (scan converter 22).

Abdel-Malek does not disclose simultaneously filtering the data subsets.

Figure 7 of Kamath discloses dividing the processed data stream into data subsets (step 72 partitioning data into regions and distributing regions onto processors) and simultaneously filtering the data subsets (step 75 thresholding wavelet coefficients of transformed data).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the simultaneous filter of Kamath with the speckle noise filter of Abdel-Malek because Kamath provides the motivation at column 5 lines 3-7 of peforming "a substantial amount of processing on very large data sets," which can occur when "the data is in the form of images."

Weisman discloses simultaneously co-displaying, in a dual display mode, a filtered image and an original unfiltered image on a common screen, wherein the filtered and the original unfiltered images are reconstructed from a data set that includes the image data stream and the processed data stream (figures 5 and 7); and enabling a user to enter the dual display mode at least one of during a scan and while a replay of pre-recorded cine loops is displayed on a screen (col. 12 line 54 through col. 13 line 17 "Generally, the user of the workstation 10 can view the echo directly from the echo machine (video source) 12, from digitized image sequences, or from videotape.... While using the workstation 10 of the invention, a physician viewing a study may wish to process the digitized images to improve their quality and diagnostic value.... A quad screen may be used").

It would have been obvious to one of ordinary skill in this art at the time of the invention to enable the user to enter the dual display mode for the simultaneous co-display of the images of Abdel-Malek and Kamath for the benefit of providing report generation that improves the analysis of an ultrasound image at taught by Weisman in the abstract.

Claim 7 is also not limited to an ultrasound image, nor is the filtering limited to speckle reduction filtering. In fact, a speckle reduced ultrasound image is not required by claim 7. This claim reads on any method that performs simultaneous filtering of an image, displays the filtered image and the raw image simultaneously, and allows a user to enter the dual display mode during a scan of anything or a replay of "cine loops" such as a video replay. Nevertheless, a narrow interpretation of claim 7 has been made in order to advance prosecution.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abdel-Malek and Kamath, and further in view of U.S. Patent Number 4,887,306 issued to Hwang et al. ("Hwang").

For claim 9, Figure 2 of Abdel-Malek discloses receiving a processed data stream from a processor (data signal 30 from the receiver is processed from an analog to a digital data stream), dividing the processed data stream into data subsets (subinterval divide 32), filtering the data subsets by using a speckle reduction filter to produce filtered data subsets (threshold processor 38), and producing an image data stream based on the filtered data subsets (scan converter 22).

Abdel-Malek does not disclose simultaneously filtering the data subsets.

Figure 7 of Kamath discloses dividing the processed data stream into data subsets (step 72 partitioning data into regions and distributing regions onto processors) and simultaneously filtering the data subsets (step 75 thresholding wavelet coefficients of transformed data).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the simultaneous filter of Kamath with the speckle noise filter of Abdel-Malek because Kamath provides the motivation at column 5 lines 3-7 of peforming "a substantial amount of processing on very large data sets," which can occur when "the data is in the form of images."

Although claim 9 does not explicitly state that the adjustable parameters are adjustable speckle reduction parameters, this feature will be addressed in order to advance prosecution. (Also, claim 9 does not require that the processed data stream is a processed data stream of ultrasound data, the scan is an ultrasound scan, the imaging system is an ultrasound imaging system, the filtered subsets are speckle reduced filtered subsets, nor that the image data stream is a speckle reduced ultrasound image data stream. However, these elements are shown in Abdel-Malek and Kamath in order to advance prosecution. Furthermore, the term "what is being imaged" is broad enough to read on any input image. The claim does not require the "optimizing the parameters based on ... what is being imaged" to be optimizing based on whether the imaging system is used to obtain liver images or vascular images. Nevertheless, in order to advance prosecution, these features are addressed).

Hwang discloses the filtering step is based on adjustable parameters, the method further comprising: automatically, without user intervention, optimizing the parameters based on a scan of an imaging system and what is being imaged (col. 2 line 48 through col. 3 line 2 "A principle concept underlying the present invention is that speckle contamination is usually more of a problem when imaging diffuse scatterers....

Examples of diffuse scatterers are the liver parenchyma and myocardium. In comparison, high intensity ultrasonic echoes usually correspond to strong specular reflectors.... Examples of high intensity echoes include those from the diaphragm, cardiac valves and vessel boundaries. Temporal compounding, as practiced in the prior art, applies the same degree of compounding to both diffuse scatterers... and the resolved structures.... This problem is avoided in the temporal compounding technique of the present invention.")

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the speckle noise filter of Abdel-Malek and Kamath to adaptively adjust the filter parameters based on what is being imaged. In this case, the particular known problem that an ultrasound of a liver produces more speckle than an ultrasound of cardiac valves was solved by the known technique of adjusting the speckle reduction parameters adaptively, without user intervention as disclosed by Hwang. One of ordinary skill in the art can combine the simultaneous filtering of Abdel-Malek and Kamath with the adaptive filtering of Hwang to yield the predictable result of simultaneously filtering data subsets adaptively based on what is being imaged to generate a speckle reduced image.

Response to Arguments

Applicant's arguments filed October 5, 2007 have been fully considered but they are not persuasive.

Applicant appears to be reading the claims to include elements that are not present in the claims. For example, claim 6 does not limit the environment to an ultrasound environment. The claim, at the very end, recites that the first and second images are "speckle-reduced images using parameters of the first value set and the second value set," yet this phrase appears disconnected from the rest of the claim. The claim does not specify that the simultaneously filtering results in a speckle reduced ultrasound image, nor that the adjustable parameters are speckle reduction parameters that are adjusted to adjust the amount of speckle that is removed from the ultrasound image, nor that the amount of speckle that is removed from the first ultrasound image is different than the amount of speckle that is removed from the second ultrasound image. In other words, this claim broadly reads on any speckle reduction method that performs simultaneous filtering of any image, regardless of whether it is an ultrasound image, and simultaneously displays two filtered versions of the image, where the filtered versions include speckle reduction. Even so, these features are addressed in this action in order to advance prosecution.

Other claims also are broader than the interpretation given by applicant as discussed in the rejections. A narrow interpretation has been given to these claims in order to advance prosecution.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Smith whose telephone number is 571 270-1235. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSS
October 18, 2007

JINGGE WU
SUPERVISORY PATENT EXAMINER